Electronic Services - Los Angeles
M10281X

Bailey

SECTION
E41-2

PRODUCT INSTRUCTIONS

ELECTRIC PRESSURE TRANSMITTER
TYPE KP12

BAILEY METER COMPANY • WICKLIFFE, OHIO 44092

FORM IE41-2-966

Bailey

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CROSS REFERENCES

Instrument or Equipment	Instruction Section
Type KM5 or WM5 Recorder or Indicator	E12-3
Class BL Telemeter Receiver	E12-73
Class JL Telemeter Receiver	E12-19

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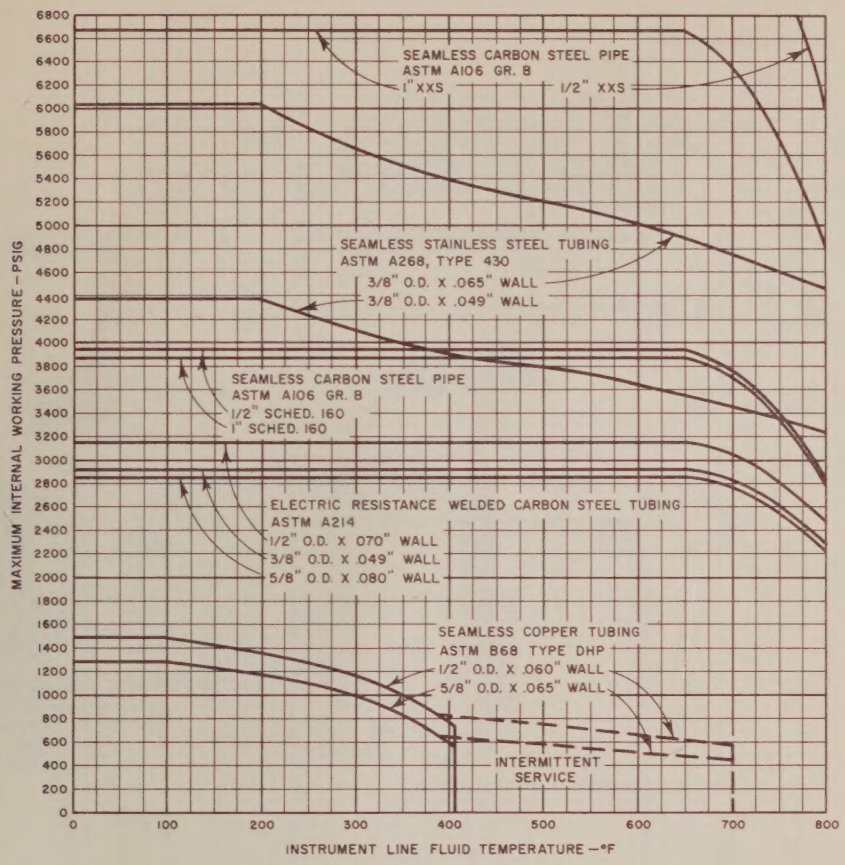


NOTES

1. The curve representing the rating of the tubing selected must lie above the intersection of lines representing the actual expected maximum sustained temperature and pressure.

2. Tubing materials, dimensions, and specifications are those of tubing stocked by Bailey Meter Company. In some cases, larger sizes are recommended. Several commercial pipe sizes have been shown for convenience.

3. If other materials or sizes or wall thicknesses are used, allowable working pressures must be calculated as provided for in code.

4. Temperatures are instrument line fluid temperatures. In steam service, tubing preceding blowdown valves shall be suitable for saturated steam temperature at the design main line pressure.

5. Copper tubing may be used in dead end steam or water service up to design pressures and temperatures shown by the dotted curves provided that the temperature within the lines for continuous service does not exceed 406F.

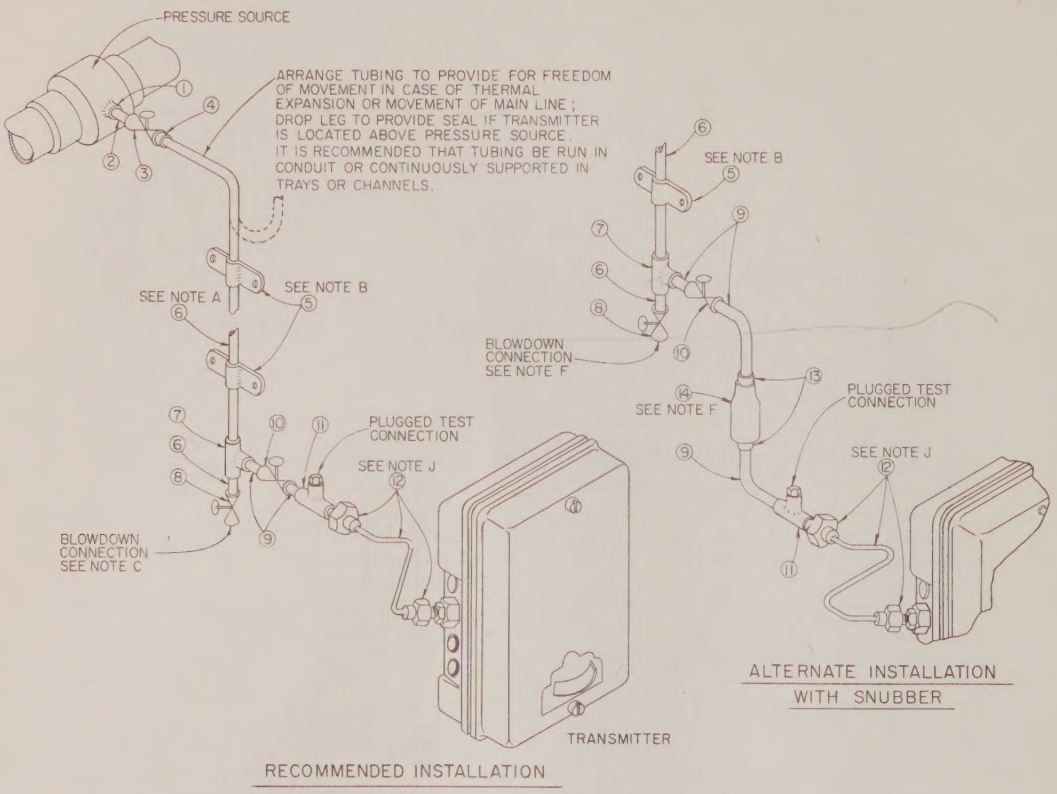
6. Pressure and/or temperature may exceed the normal design conditions occasionally provided the pressure does not exceed the allowable value for the temperature involved by more than:

(1) 15% during 10% of the operating period.
(2) 20% during 1% of the operating period.

7. The recommended minimum wall thickness for socket welded tubing is .065".

8. Tubing wall thicknesses are not calculated to provide additional thickness that may be required for mechanical strength. Tubing should be continuously supported in conduit, trays or channels.

FIGURE 1 - Selection Chart for Instrument Piping Based on Code for Pressure Piping, ASA B31.1


PRESSURE SOURCE
ARRANGE TUBING TO PROVIDE FOR FREEDOM OF MOVEMENT IN CASE OF THERMAL EXPANSION OR MOVEMENT OF MAIN LINE; DROP LEG TO PROVIDE SEAL IF TRANSMITTER IS LOCATED ABOVE PRESSURE SOURCE. IT IS RECOMMENDED THAT TUBING BE RUN IN CONDUIT OR CONTINUOUSLY SUPPORTED IN TRAYS OR CHANNELS.
SEE NOTE A
SEE NOTE B
BLOWDOWN CONNECTION SEE NOTE C
PLUGGED TEST CONNECTION
SEE NOTE J
TRANSMITTER
RECOMMENDED INSTALLATION
SEE NOTE B
BLOWDOWN CONNECTION SEE NOTE F
SEE NOTE F
PLUGGED TEST CONNECTION
SEE NOTE J
ALTERNATE INSTALLATION WITH SNUBBER

CONNECTING TUBING NOTES

A. KEEP CONNECTING LINE AS SHORT AS IS PRACTICAL. EQUIVALENT VERTICAL HEAD (VERTICAL DISTANCE BETWEEN PRESSURE SOURCE AND TRANSMITTER) IN PSIG MUST BE LESS THAN 20% OF RANGE OF TRANSMITTER.

B. DO NOT ANCHOR TUBE SO TIGHTLY THAT IT CANNOT EXPAND DURING BLOWDOWN.

C. IF TRANSMITTER IS PANEL MOUNTED, LOCATE BLOWDOWN CONNECTION OUTSIDE PANEL.

D. ALLOW AT LEAST 2 FEET OF FREE TUBING BETWEEN TRANSMITTER AND ANCHORING DEVICE CLOSEST TO TRANSMITTER.

E. MOUNT ANCHORING DEVICES CLOSEST TO TRANSMITTER ON SAME STRUCTURE ON WHICH TRANSMITTER IS MOUNTED.

F. USE PRESSURE SNUBBER FOR ALL WATER FLOW, GAS FLOW, HIGH PRESSURE (1500 PSIG OR ABOVE), HIGH VELOCITY STEAM FLOW, ANY FLOW WHERE A PUMP IS USED, OR WHENEVER RAPID PRESSURE OSCILLATIONS ARE ANTICIPATED.

H. ALL SIZES AND MATERIALS LISTED CONFORM TO THE LATEST REVISION OF THE CODE FOR PRESSURE PIPING, ASA B31.1. WHERE MATERIALS ARE NOT NOTED OR WHERE DIFFERENT FITTINGS ARE TO BE USED, ALWAYS SELECT MATERIALS THAT CONFORM TO THIS CODE. DO NOT CHANGE SIZE OF ANY ITEM TO ONE WHICH WILL NOT MEET THE CODE.

J. CONNECT SHORT LENGTH OF FLEXIBLE TUBING, ITEM 12, (FURNISHED) TO TRANSMITTER. WHEN CONNECTING TUBING, DO NOT EXERT UNDUE STRAIN ON TRANSMITTER CASING. TO REDUCE EFFECT OF VIBRATION, TUBING SHOULD NOT BE TAUT; ADD LOOP IF POSSIBLE.

MATERIAL --- SEE NOTE H

1. 1/2", 3/4", OR 1" WELDING ADAPTER, SIZE DEPENDING ON SIZE OF NIPPLE, ITEM 2.
2. 1/2" NIPPLE, FOR SERVICE UP TO 900 PSIG OR 800F.
   3/4" NIPPLE } FOR SERVICE 901 PSIG OR 801F OR HIGHER.
   1" NIPPLE }
3. 1/2", 3/4", OR 1" GLOBE VALVE, SUITABLE FOR MAXIMUM SERVICE PRESSURE AND TEMPERATURE, SIZE DEPENDING ON SIZE OF NIPPLE, ITEM 2.
4. FITTING OR BUSHING, IF REQUIRED, SIZE DEPENDING ON SIZES OF VALVE, ITEM 3, AND TUBING, ITEM 6.
5. ANCHORING CLIP OR OTHER DEVICE.
6. TUBING, WITH NECESSARY FITTINGS (SEE SELECTION CHART)
   1/2" OD TUBING OR 3/8" PIPE (OR LARGER) FOR SERVICE UP TO 1500 PSIG
   5/8" OD TUBING OR 1/2" PIPE (OR LARGER) FOR SERVICE 1501 PSIG OR HIGHER
7. REDUCING TEE, 1/4" OUTLET TO INSTRUMENT, SIZE OF STRAIGHT-THRU SECTION DEPENDING ON SIZE OF TUBING, ITEM 6.
8. GLOBE NEEDLE VALVE, SUITABLE FOR MAXIMUM SERVICE PRESSURE AND TEMPERATURE, SIZE DEPENDING ON SIZE OF TUBING, ITEM 6.
9. 1/4" STEEL NIPPLE, LENGTH AS REQUIRED, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
10. 1/4" GLOBE NEEDLE VALVE, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
11. 1/4" STEEL TEE AND PLUG, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
12. FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2, 18" LONG STAINLESS STEEL TUBING WITH 1/4" MALE CONNECTORS AT EACH END, SUITABLE FOR 5000 PSIG AT 100F, FURNISHED BY BAILEY METER COMPANY.
13. STEEL BUSHING, IF REQUIRED, DEPENDING ON SIZE OF SNUBBER, ITEM 14.
14. 1/4" OR 1/2" PRESSURE SNUBBER, ASHCROFT OR EQUAL.

FIGURE 2 - Recommended Connecting Tubing and Piping Installation

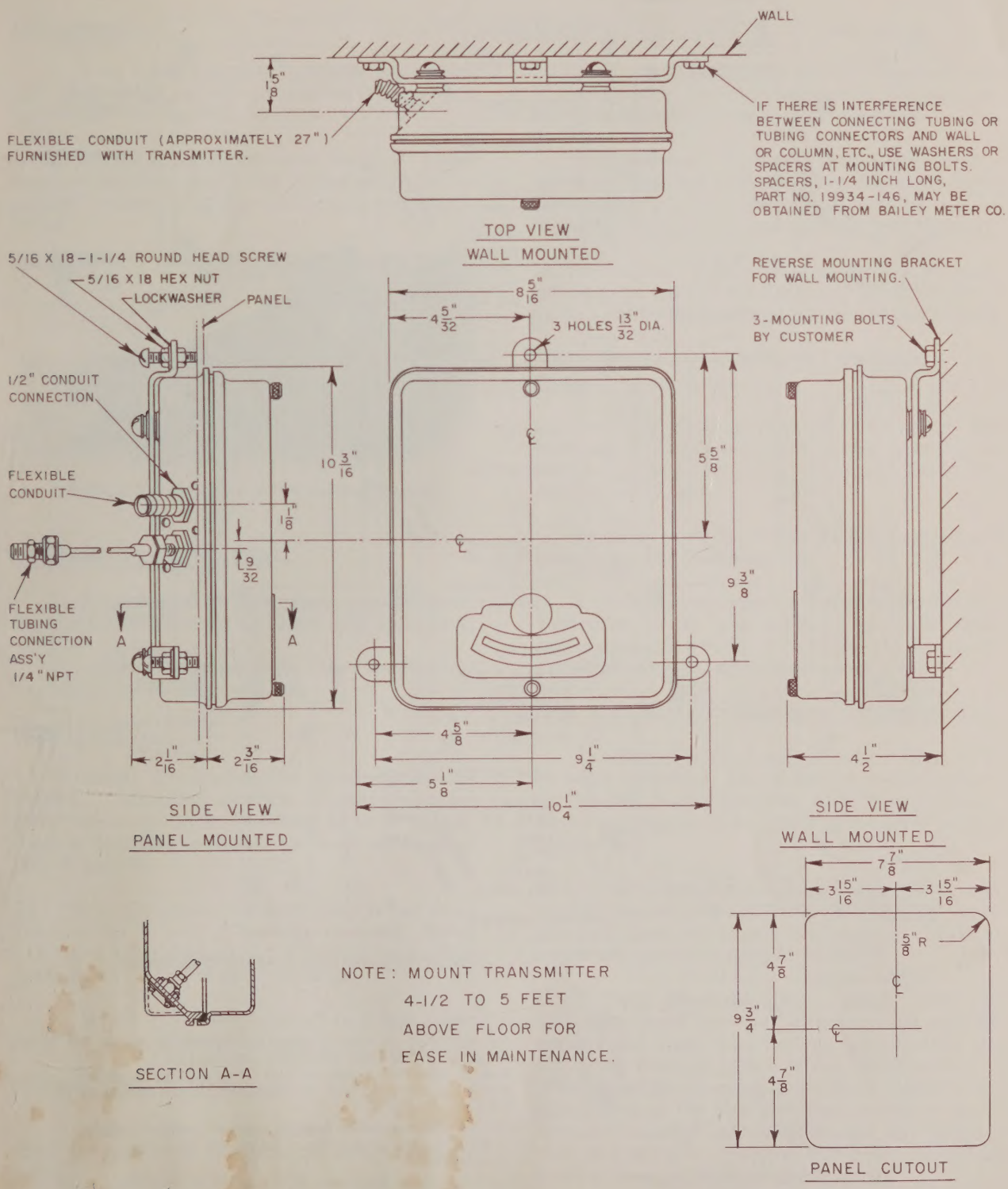
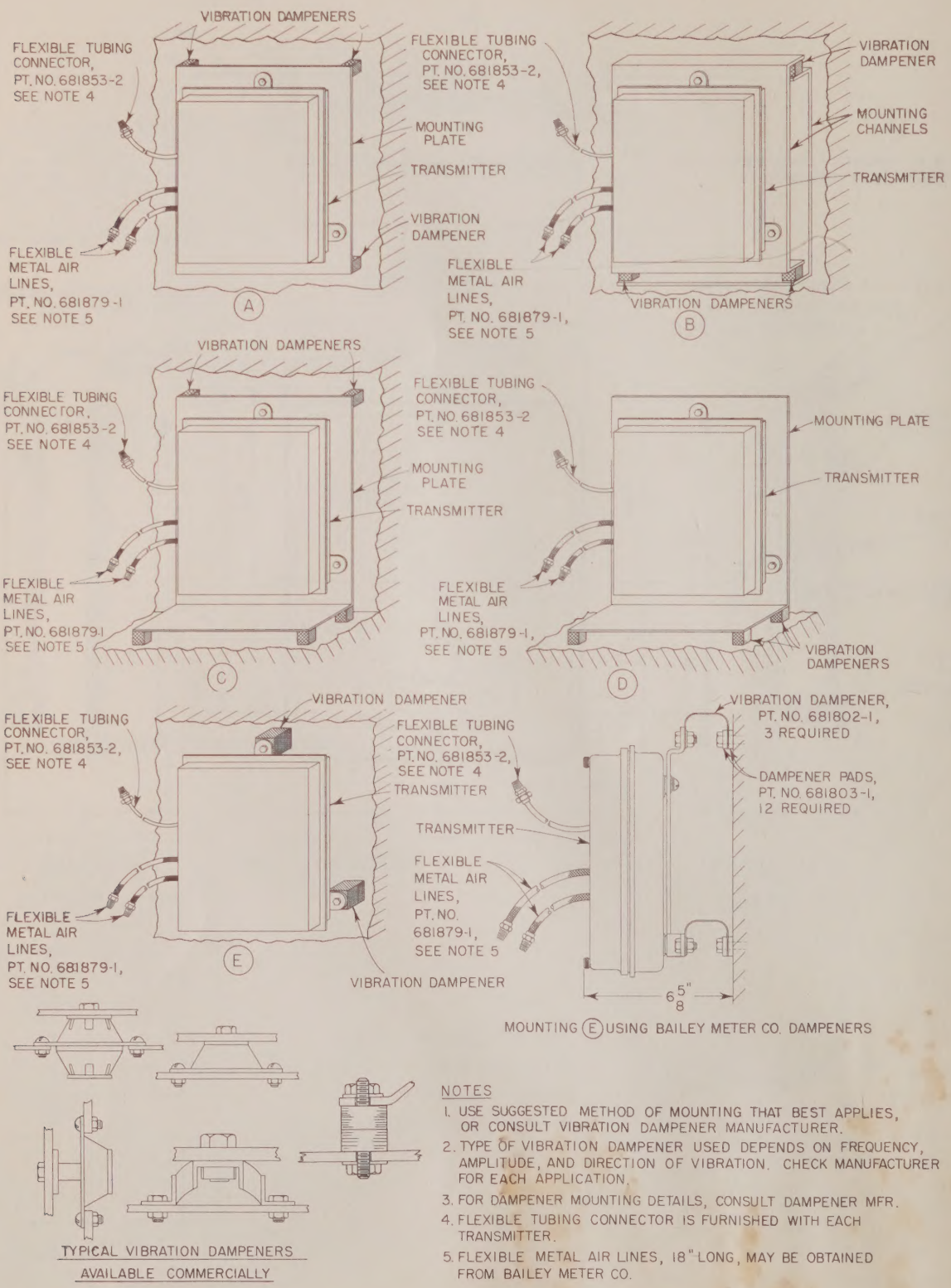


FIGURE 3 - Mounting Dimensions for Type KP12 Transmitter


VIBRATION DAMPENERS
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2 SEE NOTE 4
MOUNTING PLATE
TRANSMITTER
VIBRATION DAMPENER
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1 SEE NOTE 5
A
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2, SEE NOTE 4
VIBRATION DAMPENER
MOUNTING CHANNELS
TRANSMITTER
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1, SEE NOTE 5
VIBRATION DAMPENERS
B
VIBRATION DAMPENERS
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2 SEE NOTE 4
MOUNTING PLATE
TRANSMITTER
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1 SEE NOTE 5
C
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2 SEE NOTE 4
MOUNTING PLATE
TRANSMITTER
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1, SEE NOTE 5
VIBRATION DAMPENERS
D
VIBRATION DAMPENER
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2, SEE NOTE 4
TRANSMITTER
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1, SEE NOTE 5
E
VIBRATION DAMPENER
VIBRATION DAMPENER, PT. NO. 681802-1, 3 REQUIRED
FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2, SEE NOTE 4
TRANSMITTER
DAMPENER PADS, PT. NO. 681803-1, 12 REQUIRED
FLEXIBLE METAL AIR LINES, PT. NO. 681879-1, SEE NOTE 5
6 5/8"
MOUNTING (E) USING BAILEY METER CO. DAMPENERS
TYPICAL VIBRATION DAMPENERS AVAILABLE COMMERCIALLY

NOTES

1. USE SUGGESTED METHOD OF MOUNTING THAT BEST APPLIES, OR CONSULT VIBRATION DAMPENER MANUFACTURER.
2. TYPE OF VIBRATION DAMPENER USED DEPENDS ON FREQUENCY, AMPLITUDE, AND DIRECTION OF VIBRATION. CHECK MANUFACTURER FOR EACH APPLICATION.
3. FOR DAMPENER MOUNTING DETAILS, CONSULT DAMPENER MFR.
4. FLEXIBLE TUBING CONNECTOR IS FURNISHED WITH EACH TRANSMITTER.
5. FLEXIBLE METAL AIR LINES, 18" LONG, MAY BE OBTAINED FROM BAILEY METER CO.

FIGURE 4 - Suggested Methods of Mounting to Eliminate Vibration

INSTALLATION

UNPACKING

1. With cover removed, remove screw and spacer as noted on red warning tag (Figure 5) in lower right hand corner of case.

2. NOTE: If an adjustment check at a test bench is desired before the Transmitter is installed, refer to "Pre-Service Adjustment Check" below.

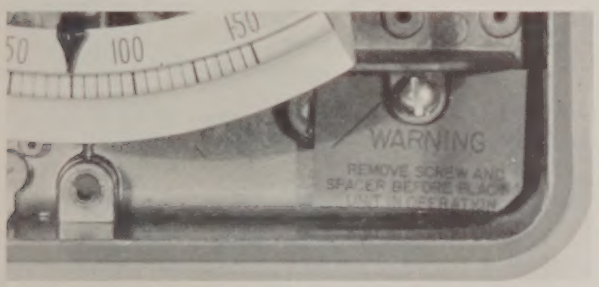


FIGURE 5 - Removing Screw and Spacer

TRANSMITTER LOCATION

1. Locate Transmitter where ambient temperature is between 40F and 140F (68F optimum).

2. Locate Transmitter as close as possible to point of measurement.

MOUNTING

1. Mount Transmitter is accordance with Figure 3. Mounting bracket is assembled for panel mounting. If Transmitter is to be wall or surface mounted, reverse the mounting bracket (see Figure 3).

CAUTION: Excessive vibration may occur when Transmitter is wall or surface mounted. Refer to Figure 4 for suggested methods for mounting Transmitter to eliminate vibration.

2. Mount Transmitter 4-1/2 to 5 feet above floor for ease of maintenance.

CONNECTING TUBING

1. Make tubing connections to measured pressure source in accordance with Figures 1 and 2.

2. Check all tubing connections for leakage (while under pressure) with a leak detecting solution.

CONNECTING WIRING

1. A length of flexible conduit which shields color-coded wires extends from the Transmitter case. Run this conduit to a junction box.

2. Make external wiring connections in accordance with applicable wiring diagrams in the Instruction Section covering the Receiver for the Transmitter (see "Cross References", page 2).

NOTE: Normal supply voltage for the primary windings of the Transmitter (and Receiver) MCT is 59 volts ac for both Model K and Model P coils.

PRE-SERVICE ADJUSTMENT CHECK MODEL K

The Type KP12 Pressure Transmitter was accurately calibrated for the range specified on the nameplate prior to shipment. Make the checks below to:

1. make certain that the calibration has not been disturbed in transit, or

2. compensate for the error introduced if Transmitter for measurement of condensable vapor or liquid pressure is located either above or below the point of measurement.

If Transmitter measures air or gas pressure:

1. Connect a dead weight tester (Figure 6) or other accurate, adjustable pressure source to flexible tubing (shipped with Transmitter). Refer to Figure 9 for MCT schematic wiring diagram.

NOTE: Before performing calibration check, energize Transmitter and Receiver circuit at least one-half hour to permit Transmitter MCT to reach its operating temperature.

2. Turn Receiver power switch OFF and manually rotate Receiver slidewire disc against zero travel limit stop (refer to applicable Instruction Section under "Cross References"). If Receiver pen is not at zero chart, make a fine adjustment of the link between Receiver drive arm and pen yoke (see "Adjustment and Calibration" in Instruction Section E12-3 for method of making linkage adjustments).

3. Apply minimum measured range pressure to Bourdon tube. Apply power to Receiver and Transmitter circuit.

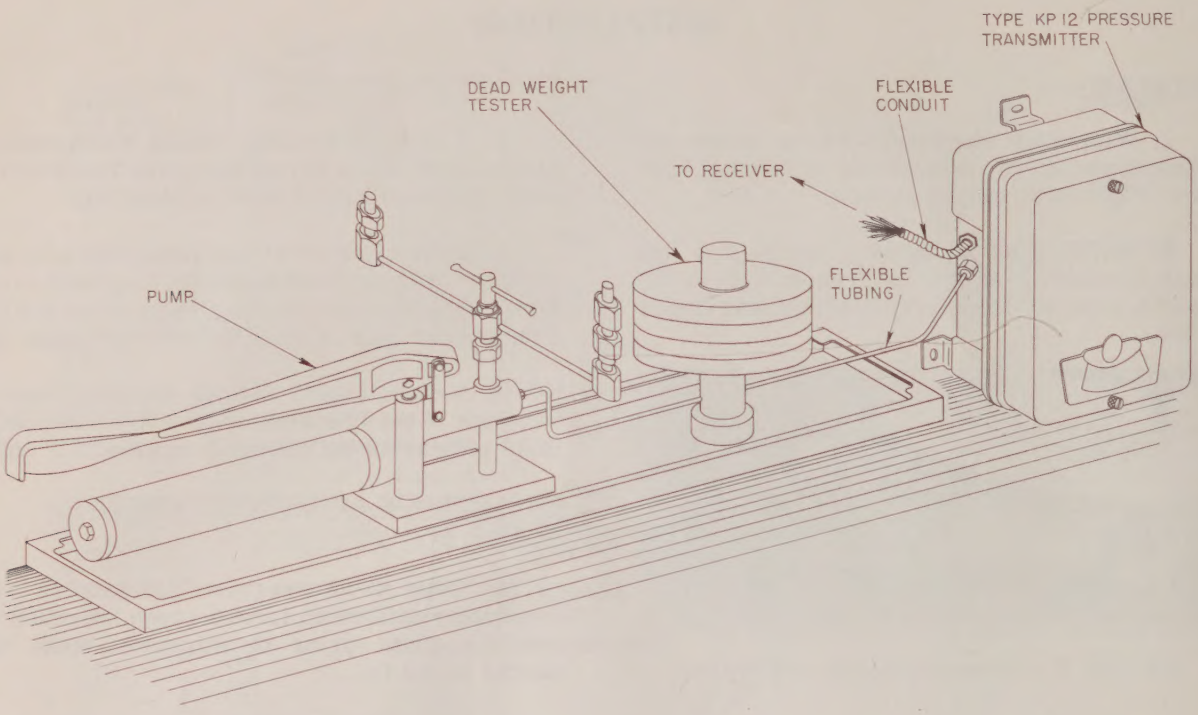


FIGURE 6 - Recommended Calibration Set Up

4. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 7) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

5. If Transmitter indicating pointer does not read minimum scale (±1/32-inch) turn pointer zero adjustment screw (Figure 7) clockwise to decrease reading or counterclockwise to increase reading.

6. Apply midrange and maximum measured range pressure to Bourdon tube. Observe (1) Receiver Chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect Transmitter from calibration set up and place in service as outlined under "Operation". If readings are incorrect, refer to "Calibration of Transmitter", page 12.

If Transmitter measures condensable vapor or liquid pressure and is located below the point of measurement:

1. Connect a dead weight tester (Figure 6) or other accurate, adjustable pressure source to flexible tubing (shipped with Transmitter). Refer to Figure 9 for MCT schematic wiring diagram.

NOTE: Before performing calibration check, energize Transmitter and Receiver circuit at least one-half hour to permit Transmitter MCT to reach its operating temperature.

2. Turn Receiver power switch OFF and manually rotate Receiver slidewire disc against zero travel limit stop (refer to applicable Instruction Section under "Cross References"). If Receiver pen is not at zero chart, make a fine adjustment of the link between Receiver drive arm and pen yoke (see "Adjustment and Calibration" in Instruction Section E12-3 for method of making linkage adjustment).

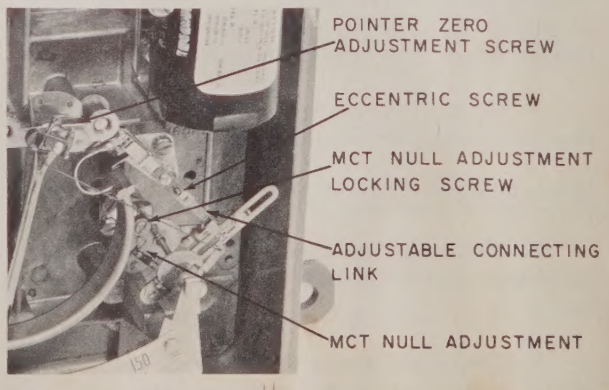


FIGURE 7 - Pre-Service Adjustments (air or gas pressure)

NOTE: When Transmitter is located below the point of measurement, a head equivalent to the vertical distance between the Transmitter and pressure source will always be present. Therefore, when placed in service with (1) shutoff valve at point of measurement closed, (2) connecting tubing filled with condensate or liquid, and (3) tubing vented at pressure source, the indicating pointer will read a value greater than zero scale. To compensate for this error when making the pre-service adjustment check at a test bench, calculate the value of the head as outlined in step 3 below.

3. EXAMPLE:

Distance from pressure source to Transmitter = 10 feet

Weight of one foot of water = .433 psi

Corrected head value = 10 x .433 = 4.33 psig

4. Apply corrected head value to Transmitter. Observe indicating pointer reading. Turn eccentric screw on adjustable connecting link (Figure 8) until pointer reads zero scale.

5. Apply minimum measured range pressure plus corrected head value to Bourdon tube. Apply power to Receiver and Transmitter circuit.

6. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 8) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

7. If Transmitter indicating pointer does not read minimum scale (±1/32-inch), turn pointer zero adjustment screw (Figure 8) clockwise to decrease reading or counterclockwise to increase reading.

8. Apply midrange and maximum measured range pressures plus corrected head value to Bourdon tube. Observe (1) Receiver chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect Transmitter from calibration setup and place in service as outlined under "Operation". If readings are incorrect, refer to "Calibration of Transmitter", page 12.

If Transmitter measures condensable vapor or liquid pressure and is located above the point of measurement:

1. Perform steps 1 and 2 above.

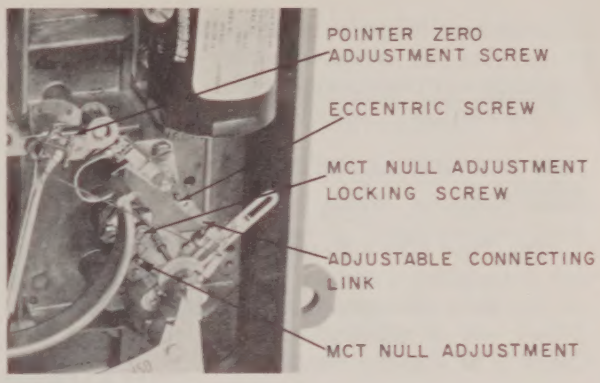


FIGURE 8 - Pre-Service Adjustments (vapor or liquid pressure)

NOTE: When Transmitter is located above the point of measurement, a negative head equivalent to the vertical distance between the Transmitter and pressure source will always be present. Therefore when placed in service with (1) shutoff valve at point of measurement closed, (2) connecting tubing filled with condensate or liquid, and (3) tubing vented at Transmitter, the indicating pointer will read a value less than maximum scale (with maximum measured range pressure applied). To compensate for this error when making the pre-service adjustment check at a test bench, calculate the value of the head as outlined in step 3 above.

2. Apply maximum measured range pressure minus corrected head value to Bourdon tube. Observe indicating pointer reading. Turn eccentric screw on adjustable connecting link (Figure 8) until pointer reads maximum scale.

3. Apply minimum measured range pressure minus corrected head value to Bourdon tube. Apply power to Receiver and Transmitter circuit.

4. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 8) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

5. If Transmitter indicating pointer does not read minimum scale (±1/32-inch), turn pointer zero adjustment screw (Figure 8) clockwise to decrease reading or counterclockwise to increase reading.

6. Apply midrange and maximum measured range pressures minus corrected head value to Bourdon tube. Observe (1) Receiver chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect

Transmitter from calibration set up and place in service as outlined under "Operation." If readings are incorrect, refer to "Calibration of Transmitter", page 12.

PRE-SERVICE ADJUSTMENT CHECK MODEL P

The Type KP12 Pressure Transmitter, Model P includes a double purpose coil consisting of two sets of secondary windings (Figure 9). Either set of windings may be connected to a Class B or Class J Receiver.

The set of secondary windings whose code is identical to the color code for the Model K, single purpose coil, is the MCT base signal (signal to which Transmitter was factory calibrated). The other set of secondary windings provides an output which transmits a proportional signal to other associated Class B or Class J remote Receivers.

Therefore, when checking the calibration of a Type KP12, Model P Transmitter, select the set of secondaries whose color code is identical to the color code for the Model K (single purpose coil) and perform the "Pre-Service Adjustment Check, Model K" as outlined on page 7.

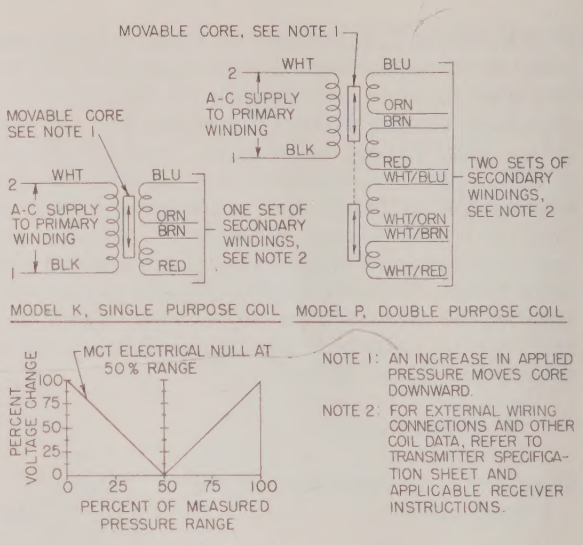


FIGURE 9 - Schematic of Type KP12 MCT

OPERATION

STARTING UP (see Figure 10)

1. Make certain that all valves are closed.

2. Open valve (3) at pressure source.

3. Slowly open blowdown valve (8) and blow down tubing or piping until clear. Then close piping valve (8).

4. When measuring steam pressure, allow tubing and piping to cool to room temperature.

5. Slowly open instrument valve (10). (Indicating pointer should read measured pressure value.)

6. Turn Receiver power switch ON to energize Transmitter and Receiver circuit.

SHUTTING DOWN (see Figure 10)

1. Close instrument valve (10) and valve (3) at pressure source.

2. Turn Receiver power switch OFF.

3. Open blowdown valve (8) to relieve pressure and allow all fluid in connecting line to drain.

4. If Transmitter is to be out of service for maintenance or for an extended period:

a. Disconnect pressure tubing from outlet of valve (3).

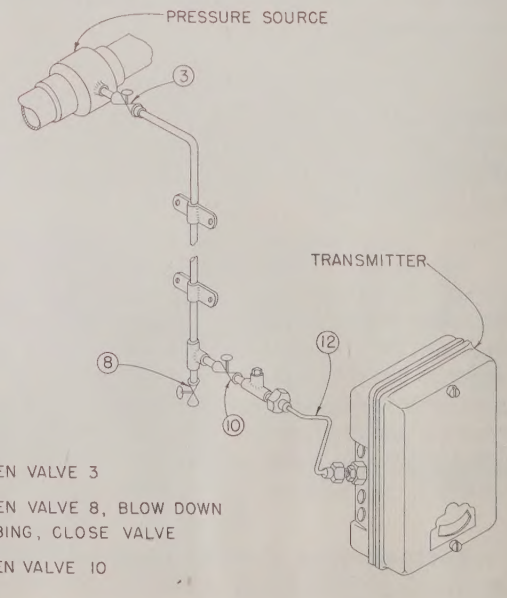


FIGURE 10 - Operation of Type KP12 Transmitter

b. Disconnect flexible tubing (12) from plugged test connection and open instrument valve (10).

c. Close blowdown valve. Reconnect all tubing and close instrument valve (10).

BLOWING DOWN TUBING AND PIPING (see Figure 10)

NOTE: Blow down tubing and piping periodically to keep lines clear while instrument is in service.

1. Close instrument valve (10).

2. Open blowdown valve (8) and blow down tubing or piping until lines are clear.

3. When measuring steam pressure, allow tubing and piping to cool to room temperature.

4. Slowly open instrument valve (10).

ROUTINE MAINTENANCE

PERIODICALLY

1. Blow down connecting piping. Refer to "Operation", page 10, for operating procedures during blow down. Make certain all connections are tight.

2. Clean Transmitter. Deposits of oil and dirt make instrument operation sluggish or inaccurate.

3. Do not oil moving parts. Oil, instead of being beneficial, may cause parts to stick.

CORRECTIVE MAINTENANCE

If system operation indicates a discrepancy in pressure measurement which is suspected or traced to the Transmitter, check the following possible sources of error.

TRANSMITTER OPERATION CHECKS

1. Transmitter must be in perfect calibration (see applicable "Pre-Service Adjustment Check").

2. The test equipment (such as that shown in Figure 6) must be accurate and sensitive.

3. Connecting piping to Transmitter must be clear and free of corrosion. Sluggish operation may indicate corrosive build-up in piping. Blow down and inspect piping (see "Blowing Down Tubing and Piping", above).

4. All connecting tubing must be air tight. Check all tubing for leakage with a leak detecting solution.

5. Check to determine if a vibration problem exists. Refer to Figure 4 for methods of eliminating vibration.

6. Faulty records or measurements are often caused by the process itself. Examine indications, records, and system component operations carefully to locate faulty component equipment.

DISASSEMBLY

Normal servicing of the Transmitter does not require that any parts be removed from the Transmitter. However, if it is necessary to remove parts for corrective maintenance or replacement, remove instrument from service as outlined under "Shutting Down" on page 10. Then, with Transmitter cover removed, follow the applicable disassembly procedures below.

BOURDON TUBE (Refer to Figure 17)

1. Disconnect adjustable link (9) from Bourdon tube tip.

2. Grasp pointer mechanism and remove two screws (30).

3. Carefully push pointer mechanism up and backward.

4. Then disconnect connecting link (32) from adjustable pointer range arm. (Do not damage hair spring while removing link.)

5. Remove three screws (29) from Bourdon tube and block assembly (28).

6. Disconnect Bourdon tube pressure connection (23) at measured pressure port and remove connection from Bourdon tube block (note hole from which connection was removed for correct reassembly). Replace Bourdon tube and reconnect connection (23) to Bourdon tube block but do not tighten.

7. Reconnect connection (23) at measured pressure port, making certain Bourdon tube and block mounting pins (at back of assembly) are aligned.

8. Hold block and tighten three screws (29). Then tighten connection (23) at block.

9. Reconnect link (32).

10. To complete reassembly, perform the operations in steps 1, 2, and 3 in reverse order.

CALIBRATION OF TRANSMITTER

CALIBRATION CHECK

Before making the Transmitting Mechanism and Indicating Mechanism calibration adjustments below, make the applicable "Pre-Service Adjustment Checks" under "Installation." If, after making these checks, the Transmitter does not operate correctly, perform the complete calibration adjustments outlined below.

NOTE: Adjust Transmitting Mechanism before attempting to correct the calibration of the Indicating Mechanism.

TRANSMITTING MECHANISM

1. Connect Transmitter in calibration setup similar to that shown in Figure 6.

2. Apply midrange pressure to Bourdon tube. Transmitter linkage should appear similar to the arrangement shown in Figure 13. If not, make the following adjustments:

a. Loosen connecting link screw and adjust length of adjustable connecting link so adjustable connecting link makes about a 90° angle with Transmitter range arm (Angle A).

b. Loosen three MCT locking screws (Figure 11). Set MCT core in about midtravel position by turning eccentric screw to shift MCT locking plate. (Position of MCT core can be determined by observing position of pin in slot at base of MCT.) Tighten locking screws.

3. Check that Receiver pen reads 50% chart.

a. If Receiver reading is correct, proceed to step 4.

b. If Receiver reading is incorrect, loosen MCT null adjustment locking screw (Figure 12) and turn MCT null adjustment until Receiver reads 50% chart. Tighten locking screw.

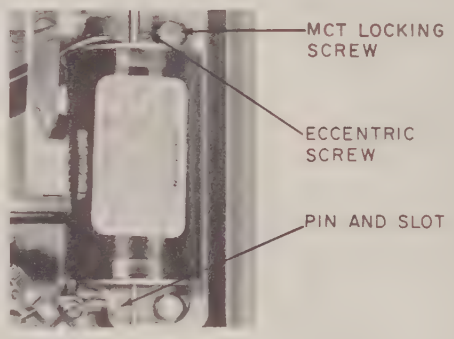


FIGURE 11 - MCT Locking Screws and Eccentric

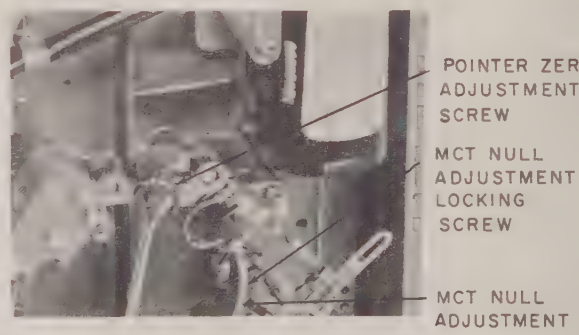


FIGURE 12 - MCT Null Adjustment

NOTE: Check Transmitter indicating pointer reading. If pointer does not read within one scale division of 50% scale, turn pointer zero adjustment screw (Figure 12) until pointer reads about 50% scale. This adjustment is not part of the Transmitting Mechanism calibration, but prevents incorrect readings caused by the pointer hitting the mounting bosses.

4. Apply 10% and 90% measured pressure range to Bourdon tube. Observe Receiver chart readings. Note whether Receiver pen travel from midrange chart toward 10% chart is equal to pen travel from midrange chart toward 90% chart.

NOTE: This check is to determine if Receiver pen motion is linear, and 90% and 10% Receiver readings need not correspond to applied pressure at this time.

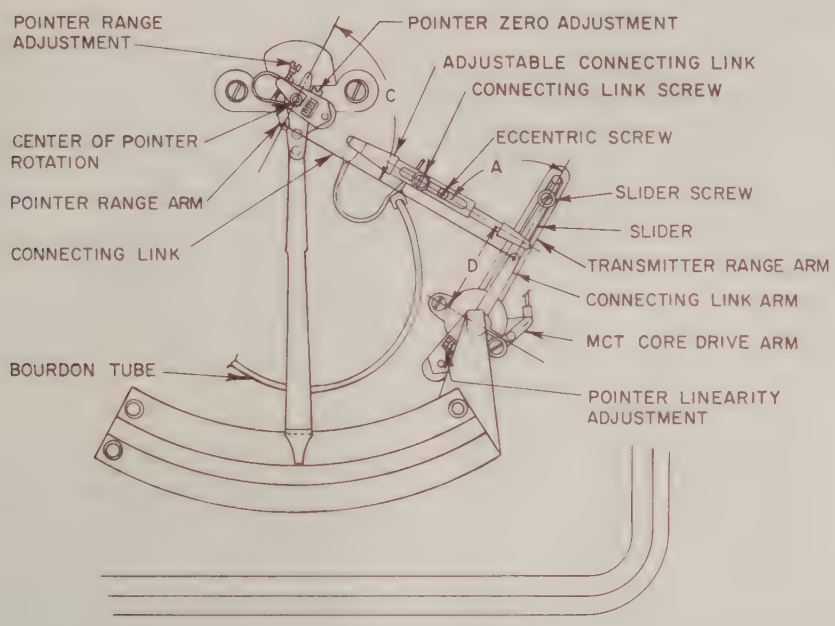


FIGURE 13 - Type KP12 Transmitter Adjustments at 50% Scale

If Receiver pen travel is equally divided on both sides of midrange chart, proceed to step 5. If travel is not equally divided, apply midrange pressure to Bourdon tube, loosen adjustable connecting link (Figure 13), and adjust length of adjustable connecting link as follows:

a. Increase link length to increase pen travel beyond midrange and to decrease pointer travel below midrange.

b. Decrease link length to decrease pen travel beyond midrange and to increase pen travel below midrange.

The amount of this adjustment should be about double the error observed between 10% and 90% chart readings. For example, if Receiver pen travel from midrange toward 10% exceeded Receiver pen travel from midrange toward 90% by two scale divisions, adjust link so as to increase reading at midrange by four scale divisions.

5. Repeat steps 3 and 4 until pen travel is uniform.

6. Apply 90% measured pressure range to Bourdon tube. If Receiver does not reads 90% chart, loosen slider screw (Figure 13) and adjust position of slider on range arm to obtain correct reading by:

a. Decreasing Dimension D to increase Receiver reading, or

b. Increasing Dimension D to decrease Receiver reading.

c. Tighten slider screw.

d. Apply midrange pressure to Bourdon tube. If Receiver does not read midrange pressure, loosen Transmitter MCT null locking screw and turn MCT null adjustment screw (Figure 12) to obtain correct reading. Tighten locking screw.

e. Repeat step 6 until 90% and midrange readings are correct.

7. Apply 10% measured pressure range to Bourdon tube. If Receiver does not read 10% chart, linear motion of the Receiver pen (obtained in step 4) has been disturbed. Repeat the adjustments in steps 4, 5, and 6 until 90%, 10% and 50% chart readings are correct when corresponding measured pressure is applied to the Bourdon tube.

8. Check Indicating Mechanism calibration as outlined on page 14.

INDICATING MECHANISM

The function of the Type KP12 Pressure Transmitter is to transmit an electrical signal representing a measured pressure. The indicating pointer is intended merely as a guide and its accuracy need not match that of the Transmitting Mechanism. In the final calibration check, step 9 below, the indicating pointer should read correctly within 1/32-inch.

1. Apply midrange measured pressure to Bourdon tube. If indicating pointer reads midscale, proceed to step 3. If pointer reading is incorrect, turn pointer zero adjustment screw (Figure 13) until scale reading is correct. Turn counterclockwise to decrease reading or clockwise to increase reading. (Linkage should appear similar to that shown in Figure 13.)

2. The point at which the connecting link is attached to the pointer range arm should make about a 90° angle with the center of pointer rotation (Angle C). Turn pointer zero adjustment to obtain this relationship.

3. Loosen pointer linearity adjustment locking screw (Figure 14) and turn pointer linearity adjustment screw until pointer reads midscale. Tighten locking screw.

NOTE: Adjusting the pointer linearity adjustment screw rotates the lower pivot shaft with respect to the Transmitter range arm, thus changing the null position of the Transmitter MCT core. Reset the MCT null adjustment by loosening the MCT null adjustment locking screw and turning the MCT null adjustment screw until Receiver reads 50% chart. Tighten locking screw.

4. Apply minimum, midrange, and maximum range pressure to Bourdon tube. Note whether pointer travel from midscale toward minimum scale is equal to pointer travel from midscale toward maximum scale.

NOTE: This determines whether indicating pointer motion is linear, and maximum and minimum scale readings need not correspond to applied pressures at this time.

If pointer travel is equally divided on both sides of midscale, proceed to step 5. If not, apply midrange pressure to Bourdon tube, loosen pointer linearity adjustment locking screw, and turn pointer linearity adjustment screw (Figure 14) as follows:

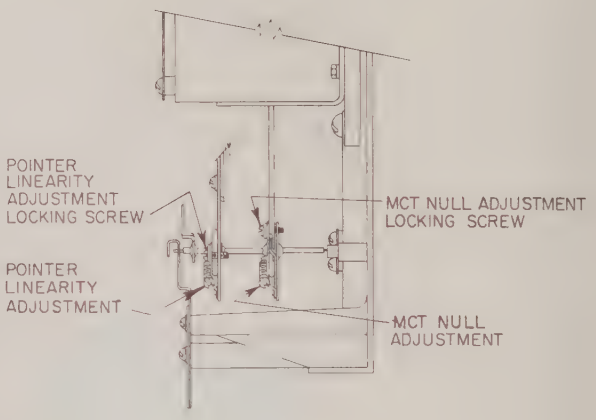

POINTER LINEARITY ADJUSTMENT LOCKING SCREW
POINTER LINEARITY ADJUSTMENT
MCT NULL ADJUSTMENT LOCKING SCREW
MCT NULL ADJUSTMENT

FIGURE 14 - MCT Null and Pointer Linearity Adjustments

a. Turn screw counterclockwise to increase pointer travel beyond midscale and to decrease pointer travel below midscale.

b. Turn screw clockwise to decrease pointer travel beyond midscale and to increase pointer travel below midscale.

The amount of this adjustment should be about double the error observed between minimum and maximum scale readings. For example, if pointer travel from midscale to minimum scale exceeded pointer travel from midscale to maximum scale by two scale divisions, turn pointer linearity adjustment screw to increase reading at midscale by four scale divisions.

c. Tighten pointer linearity adjustment locking screw.

d. Reset pointer at midscale by turning pointer zero adjustment screw (Figure 13).

e. Repeat steps 3 and 4 until pointer travel is uniform.

5. Apply maximum range pressure to Bourdon tube. If pointer does not read maximum range, turn pointer range adjustment screw (Figure 13) clockwise to decrease reading or counterclockwise to increase pointer travel.

6. Apply midrange pressure to Bourdon tube. If pointer does not read midrange pressure, turn pointer zero adjustment screw to correct reading.

7. Repeat steps 5 and 6 until maximum and midscale readings are correct.

8. Apply minimum range pressure to Bourdon tube. If pointer does not read minimum scale, linear motion of the indicating pointer (obtained in step 4) has been disturbed. Repeat the adjustments in steps 4 and 5 until correct readings are obtained.

9. Make a final check to determine that Receiver readings and Transmitter indicating pointer scale readings are correct when minimum, maximum, and midrange pressures are applied to the Bourdon tube.

BOURDON TUBE STOPS

1. Set minimum travel stop (Figure 15) by manually positioning Bourdon tube end stop so that indicating pointer reads 1/16 inch to 1/32 inch less than minimum scale mark. Loosen minimum stop screw and position next to Bourdon tube end. Then tighten screw securely.

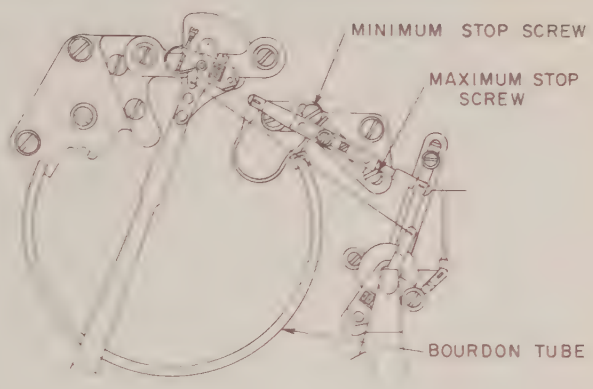


FIGURE 15 - Minimum and Maximum Stop Screws

2. Set maximum travel stop by manually positioning Bourdon tube end stop so that indicating pointer reads 1/16 inch to 1/32 inch more than maximum scale mark. Loosen maximum stop screw and position next to Bourdon tube end. Then tighten screw securely.

DESCRIPTION OF OPERATION

The measuring and indicating mechanism of the transmitter (Figure 16) consists of a Bourdon tube connected by linkage to an indicating pointer and MCT (movable core transformer) core drive arm. Measured pressure is applied to the Bourdon tube causing it to move. This motion is transmitted thru linkage to position the indicating pointer and the MCT core drive arm.

The Transmitting mechanism is an MCT (refer to Figure 9). The MCT consists of a solenoid coil with a single primary winding and one (Model K) or two (Model P) secondary windings. A plunger-type core is placed in the bore of the coil and the position of the core determines the voltage induced in the secondary winding(s).

When the measured pressure increases, the free end of the Bourdon tube is displaced in proportion to the measured pressure. This motion is transmitted thru linkage to position the indicating pointer and the MCT core drive arm, causing the core to move downward in the MCT. As the position of the core varies, the voltage(s) across the secondary winding(s) varies to produce a signal output voltage proportional to the measured pressure.

When measured pressure decreases, all movement is in the opposite direction to that described above.

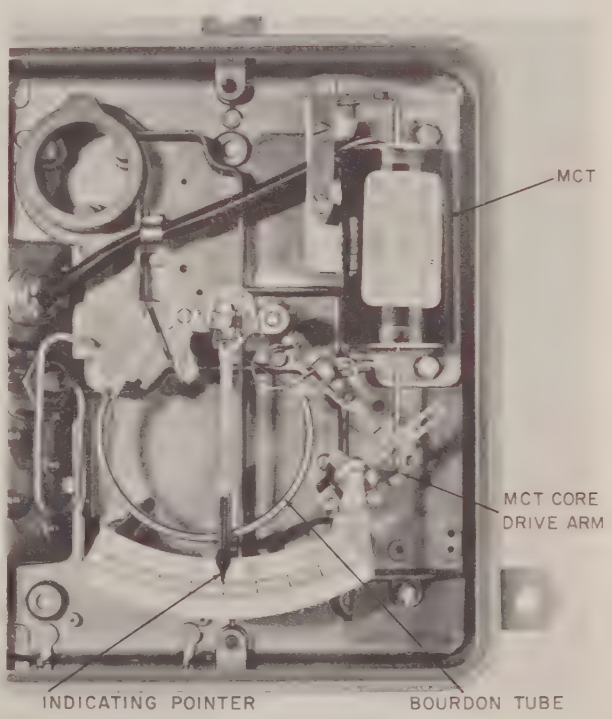
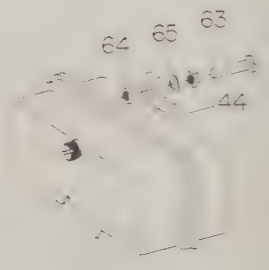
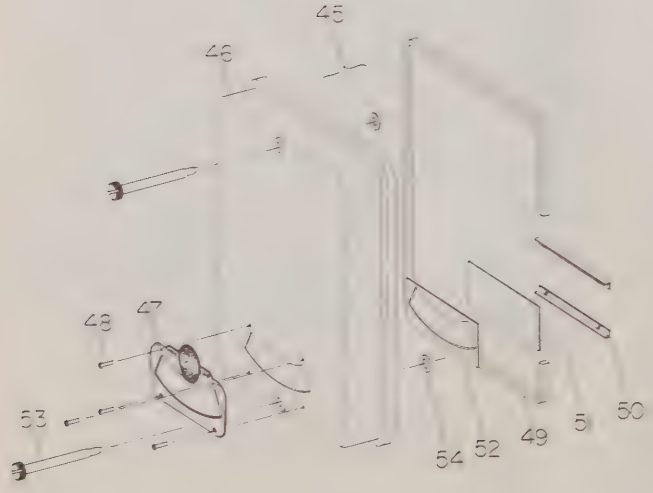


FIGURE 16 - Type KP12 Transmitter Mechanism





REPLACEMENT PARTS

ORDERING INDIVIDUAL PARTS

Figure 17 is a Parts Drawing of the Type KP12 Pressure Transmitter. Normally, this drawing applies to the Transmitter furnished. However, there may be individual differences in specific units because of:

a. design changes made since the printing of this Instruction Section, or

b. special design of the Transmitter to make it suitable for a special application.

Therefore, when ordering parts, assure receipt of correct replacements by specifying on the order:

1. Complete indentification including the nomenclature, part number, and serial number of the assembly.

2. Parts Drawing number on which each part is illustrated.

ITEM	PART NO.	NAME
1	SEE NOTE	CODE LABEL
2	68806-1	HOUSING
3	681651-2	MECH SUPPORT BRKT
4	6617032-1	SHAFT SUPPORT
5	6617034-1	CTWT & DRIVE ARM ASSEMBLY
6	666297-1	ECCENTRIC
7	666296-1	ECCENTRIC RET PLATE
8	6618596-1	COIL & SUPPORT ASSY FOR MODEL K
	6618596-2	COIL & SUPPORT ASSY FOR MODEL P
9	666957-1	LINK ASSEMBLY
10	667571-1	DRIVE ARM SLIDER
11	2-56x1/8	PAN HD SST SCR, 2 REQD
12	NO. 2 SAE	SST WASHER, 2 REQD
13	667243-1	PLUNGER ASSEMBLY
14	6615428-1	PIVOT SHAFT ASSY
15	10-32x3/8	PAN HD SST SEMS EXT
16	19934-32	SPACER
17	1/4x20x3/4	PAN HD SST SEMS EXT, 3 REQD
18	5317034-1	COVER PLATE
19	6-32x5/16	PAN HD SST SCR, 5 REQD
20	1606-00	SHPRF SST LKWASH, 5 REQD
21	6-32	SST HEX NUT, 5 REQD
22	SEE TABLE	CONNECTOR ASSY
23	SEE TABLE	BOURDON TUBE PRESSURE ASSEMBLY
24	8-32x5/16	PAN HD SST SCR, 6 REQD
25	1608-00	SHPRF SST LKWASH, 2 REQD
26	8-32	SST HEX NUT, 2 REQD
27	197118-2	CONDUIT CONNECTOR
28	SEE TABLE	TUBE & BLOCK ASSY
29	6-32x7/8	PAN HD SST SEMS EXT, 3 REQD
30	4-40x5/16	PAN HD SST SEMS EXT, 2 REQD
31	666624-1	POINTER MECH ASSY
32	667572-1	LINK
33	6617031-2	MOUNTING PLATE
34	667693-2	PIVOT SHAFT
35	667118-1	UPPER BEARING PLATE
36	3-48x5/16	PAN HD SST SCR, 3 REQD
37	666970-1	LOWER BEARING PLATE
38	6-32x1/4	PAN HD SST SEMS EXT, 5 REQD
39	10-32x3/8	PAN HD SST SEMS EXT, 3 REQD
40	681441-1	GROMMET, 3 REQD
41	5/16-18x3/4	PAN HD STL SCR, 3 REQD
42	19734-17	WASHER, 3 REQD
43	681442-1	SPACER, 3 REQD
44	68856-1	MOUNTING STRAP
45	68854-1	COVER ASSY INCLUDES ITEMS 46 THRU 54
46	68855-1	COVER
47	196778-1	STYLING PLATE
48	2x3/8	TYPE 2 SELF TAPPING SCREW, 4 REQD
49	5316543-1	SEALING STRIP
50	511184-3	CLAMP
51	681169-1	WINDOW
52	68522-1	GASKET
53	5311409-2	COVER SCR, 2 REQD
54	198173-16	RETAINING RING, 2 REQD
55	68863-1	STOP PLATE
56	68864-1	STOP SCREW, 2 REQD
57	68865-1	NUT, 2 REQD
58	1604-00	SHPRF SST LKWASH, 2 REQD
59	1961155-1	INSTRUCTION LABEL
60	27"	.263 ID X .020 WALL (NOMINAL) RUB. TUBING
61	38"	1/2" ID X .617 OD (NOMINAL) FLEX. STL TUBING
62	666368-2	CABLE SUPPORT
63	5/16-18x1-1/4	PAN HD SCR, 3 REQD
64	5/16-18	STL HEX JAM NUT, 6 REQD
65	118-00	SHPRF LKWASH, 3 REQD
66	0-1/8	RD HD SST THD FORMING SCR TYPE-U, 2 REQD
67	196776-1	NAMEPLATE
68	68930-1	SCALE, SPECIFY RANGE
69	49126-1	SPECIAL SCR, 2 REQD
70	49182-1	SHAFT COLLAR, 2 REQD
71	312097-1	LINK SPRING END
72	35390-1	STUD, 2 REQD
73	10-32x5/16	PAN HD SST SCR,2 REQD
74	532172-1	SPRING WASHER
75	197120-5	ELASTIC STOP NUT
76	10-32x3/4	PAN HD SST SCR
77	1703-00	SST SHPRF LKWASH, 3 REQD
78	1610-100	SST SHPRF LKWASH, 2 REQD
79	1218-00	SST SHPRF LKWASH, 3 REQD

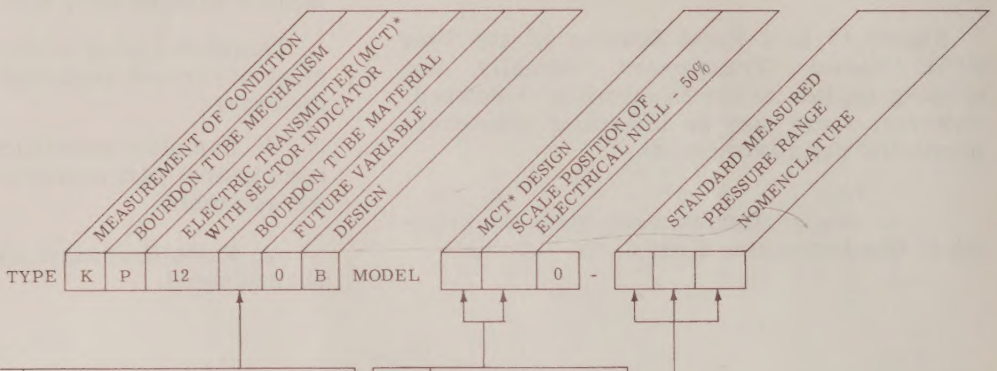
NOTE: WHEN ORDERING PARTS, SPECIFY NUMBER ON CODE LABEL (ITEM 1).

TABLE				
TYPE	MODEL	ITEM 22	ITEM 23	ITEM 28
KP1210	--	OMIT*	OMIT*	6610195-□
KP1220	□013 thru □042, □055 thru □082, □102 thru □221	68848-1	666598-1	667560-□
	□044, □084, □222	6610560-1	682873-1	
KP1250	--	OMIT*	OMIT*	6619289-□

*ITEMS 22 AND 23 INCLUDED IN TUBE AND BLOCK ASSEMBLY, ITEM 28.

FIGURE 17 - Parts Drawing E41-43, Type KP12 Transmitter

EXPLANATION OF NOMENCLATURE



	Bourdon Tube Material	Pressure Limits	
		Min. - Max.	Min. - Max.
1	Beryllium Copper	4001-8000 psig	281-562 kg/cm^2
2	Ni Span C	30-4000 psig	2.11-281 kg/cm^2
5	Type 316L Stainless	30-4000 psig	2.11-281 kg/cm^2

See Note	Output Signal Range
KA	2.5 - 0 - 2.5 VAC
PA	2.5 - 0 - 2.5 VAC 2.5 - 0 - 2.5 VAC

STANDARD RANGE NOMENCLATURE

ENGLISH UNITS				METRIC UNITS			
Nomenclature	Pressure Range, psig	Nomenclature	Pressure Range, psig	Nomenclature	Pressure Range, kg/cm^2	Nomenclature	Pressure Range, kg/cm^2
013	0-30	044	0-4000	102	0-2	150	0-50
014	0-40	045	0-5000	103	0-3	151	15-50
015	0-50	046	0-6000	104	0-4	160	0-60
016	0-60	048	0-8000	105	0-5	162	20-60
017	0-70	055	20-50	106	0-6	173	35-70
018	0-80	058	20-80	108	0-8	180	0-80
020	0-100	063	100-300	110	0-10	182	20-80
021	0-150	064	100-400	115	0-15	200	0-100
022	0-200	065	200-500	120	0-20	203	30-100
023	0-300	067	200-700	121	5-20	210	0-150
027	0-160	068	300-800	122	10-20	220	0-200
024	0-400	070	500-1000	125	0-25	221**	50-200
025	0-500	071	300-1100	130	0-30	222**	50-250
026	0-600	072**	600-1200	132**	10-30	230	0-300
028	0-800	073	400-1200	133**	15-35	240	0-400
030	0-1000	075	500-1500	140	0-40	250	0-500
032	0-1200	080	500-2000				
035	0-1500	081	500-2500				
040	0-2000	082	500-3000				
041	0-2500	084	500-4000				
042	0-3000						

NOTE:
1. Model K designed for one output signal. Model P designed for two output signals.
2. Electrical null is position of core within MCT* at which electrical outputs across each set of secondary windings are equal.

* Movable Core Transformer
**These ranges are unattainable with the Type KP1250 Pressure Transmitter.

An "X" in any Nomenclature position indicates that the variation is special. An "X" as a suffix to either Type or Model indicates that the Transmitter includes some special feature not covered by the standard Nomenclature.

Product Warranty

Bailey Meter Company warrants the products manufactured by it to be free from defects in material and workmanship and will repair or replace, at its option, free of charge, f.o.b. its factory, such part or parts which prove defective within one year from date of shipment. In respect to any products which are not an integral part of a product manufactured by the Company, the warranty given by the manufacturer thereof shall apply.

Shipping Damage

We strongly recommend that you inspect and test your instrument as soon as you receive it. If the instrument is damaged or operates improperly, notify the carrier for inspection of the shipment. The carrier's claim agent will prepare a report of damage, a copy of which should be forwarded to your nearest Bailey District Office (see back cover for location). The District Office will then tell you how to have the instrument repaired or replaced.

Service

The Bailey Meter Company is vitally concerned that your Bailey instrument provides continued, fine performance. This instruction manual is designed to fully describe the correct installation, operation, and maintenance of your instrument under recommended conditions. If the need arises, factory-trained Service Engineers are on call for prompt, in-plant maintenance. Telephone or wire your nearby Bailey District Office to make arrangements for this service (see back cover for location and telephone number).

Replacement Parts and Supplies

Complete parts drawings and recommended spare parts kit information are included in this instruction manual. When replacement parts or supplies are required for maintenance of your Bailey instrument, contact your nearest Bailey District Office (see back cover for location). Always specify complete data on the instrument nameplate on your inquiry or order for parts. Common parts are available for shipment within 48 hours on a speed-order basis.

BAILEY METER COMPANY DISTRICT OFFICES, U.S.A.

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San Francisco
Code 415 Phone 781-0926

Los Angeles
Code 213 Phone 283-1187

COLORADO

Denver
Code 303 Phone 322-7745

GEORGIA

Atlanta
Code 404 Phone 378-4348

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Boston
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MICHIGAN

Detroit
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Code 612 Phone 645-7752

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Code 314 Phone 962-5532

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Buffalo
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New York
Code 212 Phone 986-8770

Schenectady
Code 518 Phone 374-7991

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East Orange
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OHIO

Cincinnati
Code 513 Phone 281-0132

Cleveland
Code 216 Phone 851-8600

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Code 713 Phone 526-1628

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Code 206 Phone 324-9300

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Vancouver
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MANITOBA

Winnipeg
Code 204 Phone 943-1481

NOVA SCOTIA

Halifax
Code 902 Phone 455-0574

ONTARIO

Ottawa
Code 613 Phone 722-1373

Toronto
Code 416 Phone 444-8488

QUEBEC

Montreal
Code 514 Phone 489-3881

Bailey

Bailey Meter Company • Wickliffe, Ohio 44092

In Canada: Bailey Meter Company Limited, Montreal, Canada